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U. S. DEPARTMENT OF AGRICULTURE.

REPORT

OF THE

CHIEF OF THE DIVISION OF BOTANY

FOR

1895.



WASHINGTON:

GOVERNMENT PRINTING OFFICE.

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REPORT OF THE CHIEF OF THE DIVISION OF BOTANY.

SIR: I have the honor to submit herewith my third annual report as Botanist of the Department of Agriculture, for the year ending June 30, 1895.

Respectfully,

FREDERICK V. COVILLE,
Botanist.

Hon. J. STERLING MORTON,
Secretary.

WORK OF THE YEAR.

As indicative of the relative amount of money expended for investigations in this and the two preceding years, it may be said that from the roll of the Division of Botany in June, 1893, it appears that 35 per cent of the money expended for salaries was devoted to investigations; the remainder to clerical and mechanical labor. In June, 1894, 42 per cent was devoted to investigations, and in June, 1895, 57 per cent. It is believed that by securing for the botanical work of the Department trained investigators the results will be much greater in proportion to the money expended than when the work is carried on more largely by clerical assistants. In accordance with this idea, all new positions and all vacancies have, as far as possible, been filled through special technical examinations held by the Civil Service Commission.

I wish to say in this connection that an experience of seven years, first as an assistant in this division, later as its chief, enables me to say without reservation that the civil service examinations have been a positive success in assisting the department authorities to make the best selection from several candidates for a vacancy. Of six positions filled in this way during the year, each requiring a good general education and a special knowledge of the technique of botany, all were secured by persons who had spent from four to eight years in training for such work, and the quality of the service rendered, which is the final test of any plan of selection, fully justifies this system. I believe it to be far superior to selection based on personal recommendation, whether made by public officers, by private citizens, or by college professors, when not supported by an actual examination of the candidates themselves.

HERBARIUM.

Since the National Herbarium in the custody of the Department of Agriculture had outgrown its available quarters, since it was not in a fireproof building, and since the space it occupied was needed for other

purposes by the Department of Agriculture, the Secretary of Agriculture entered into correspondence with the Secretary of the Smithsonian Institution with a view to the transfer of the herbarium to the National Museum building, and satisfactory terms having been made the Botanist of the Department was directed to effect the transfer. This was completed November 1, 1894, room having been provided for about three-fourths of the herbarium, the remainder being still housed at the Department of Agriculture. The details of this transfer are given more fully in my report as honorary curator of the department of botany in the National Museum, as is also the detailed report on the condition, accessions, and management of the herbarium.

WEEDS.

Mr. L. H. Dewey, one of the assistant botanists, has continued his investigations of weeds, paying particular attention during the year to the Russian thistle, nut grass, and live-forever. The largely increased demand for information regarding the Russian thistle has been supplied by the publication of Circular No. 3. The Division of Botany has been instrumental in bringing to the attention of State authorities the advent of the Russian thistle in certain Western States and in pointing out to them the necessity of at once providing means for its eradication. An appreciative response has been made in some cases, particularly in California, where immediate steps were taken by the State experiment station to prevent the spread of the weed, a special agent being employed to inspect the railroad properties and indicate to the authorities all places in which the plant had already obtained a foothold. A circular on nut grass has been issued and distributed widely throughout the Southern United States, where this plant is a most pernicious pest in cultivated fields. The weed known as live-forever (*Sedum telephium*) in the New England and Middle States, which often renders large areas of meadow land almost worthless, was investigated with a view to the wider dissemination of knowledge regarding a disease which in certain localities is known to have entirely killed out the plant. An interesting report on this subject will be forthcoming during the ensuing year. Information respecting all the different weeds of the United States is gradually being accumulated, with a view ultimately to the publication of an illustrated handbook on the subject, prepared for the special use of farmers. A partial report of this nature has been issued as Farmers' Bulletin No. 28, entitled Weeds; and How to Kill Them. In addition to illustrations and special remarks regarding some of the weeds, is given a tabular arrangement of the most important facts, from a practical standpoint, concerning about one hundred of our commoner species, with brief instructions as to the best methods for their eradication. A bulletin has also been prepared on the subject of weed legislation, consisting of a compilation of the weed laws now in force in different States, and suggestions for similar legislation by other States.

PURE SEED.

The laboratory for pure seed investigations has been removed from the main building of the Department of Agriculture to a brick dwelling house, 212 Thirteenth street SW., which has been fitted up for laboratory purposes, and assigned in part to the Division of Botany. The equipment for investigation has been materially improved by the increase of the seed collections, which at the close of the year contained

a total of 7,528 specimens. Fourteen hundred of these specimens were purchased from Mr. P. Hennings, of Berlin, Germany, and are especially valuable in the identification of impurities in imported seed. The other specimens have been obtained by collection and by exchange with both foreign and American botanists and botanical institutions. Several new and valuable pieces of apparatus have also been added to the laboratory equipment.

In view of certain foreign representations regarding the alleged impurity of American clover seed, made, evidently, with a view to discredit the excellence of our exported product, correspondence was entered into with the principal clover-exporting firms of the United States relative to the feasibility and necessity of an official clover inspection at ports of shipment. It was found that a detailed inspection would present decided difficulties, perhaps insurmountable, seriously interfering with the present methods of shipment. Furthermore, the agrarian spirit in those European countries in which protests have been made against American seed would be little, if at all, affected by any inspection, however exacting and conclusive. In view of this condition of affairs, no official inspection of clover seed was recommended to the Department authorities.

Our special investigation of clover seed, begun late in the preceding fiscal year, has been continued. A circular letter asking for detailed local information has been sent to the statistical agents of the Department, and the facts thus elicited have been tabulated for use. A personal inspection of the methods of handling and growing seeds has also been made in Baltimore, and in the States of Ohio and Indiana. Numerous samples of clover seed have been obtained from producers and dealers in different parts of the country, which will form the basis of germination and purity tests, to be conducted during the coming year.

The seeds purchased by the Department of Agriculture for distribution in the fiscal year 1895 have all been submitted to purity and germination tests, the number of these tests reaching 717 and involving the separation and counting of over 120,000 seeds, a fact which may give some idea of the painstaking care required in conducting such an investigation. Many of the varieties showed a surprisingly low per cent of germination and several cases of evident fraud were detected.

The greenhouse facilities that were recommended in my last annual report have been provided, consisting of a space of about 720 square feet in one of the Department greenhouses. This was ready for occupation in the last week of the year.

POISONOUS PLANTS.

In my last annual report I pointed out the desirability of investigating the poisonous plants of the United States for purposes of popular information regarding their identification, poisonous effects, and proper antidotes. This work was commenced in November, 1894.

A collection of crude drugs to the number of nearly 400, representing about 300 species of plants, has been contributed by Messrs. Parke, Davis & Co., Detroit, Mich.; Stearns & Co., Detroit, Mich.; Lloyd Bros., Cincinnati, Ohio; Gilpin, Langdon & Co., Baltimore, Md.; Burrough Bros., Baltimore, Md., and Merck & Co., of Darmstadt, Germany. The specimens are accompanied in most cases by chemical products or extracts and are invaluable in the identification and comparison of poisonous and medicinal plants sent to the Department for examina-

tion. The library of the Department has been increased by the purchase of several of the more important pharmacological publications, and a large amount of bibliographical work has been done in bringing together in convenient form for ready reference information relative to our native poisonous plants.

The first subject of investigation taken up has been that of laurel poisoning. A résumé of all published information on this topic has been made, some chemical and physiological work carried on for the purpose of elucidating certain doubtful points, and a report on the whole subject submitted. Incidentally work has been done upon two other plants, the western leatherwood (*Dirca occidentalis*) and a native weed of the southwestern United States (*Datura meteloides*), both of which contain poisons.

GRASSES AND FORAGE PLANTS.

The work on this subject is in charge of Prof. F. Lamson-Scribner. The reports in preparation on grasses and forage plants have been continued, the efforts of Professor Scribner and his assistants being devoted particularly to an illustrated descriptive publication on the grasses of the United States. Circulars on the Flat Pea and Sachaline have been issued, and a paper on "Grasses as sand and soil binders" was prepared for publication in the Yearbook of the Department for 1894.

By action of the last Congress the work upon grasses and forage plants has been separated from the Division of Botany and placed in charge of a newly created Division of Agrostology, this arrangement having taken effect July 1, 1895.

FIELD WORK.

During the latter half of 1894 three field agents were employed by the Department of Agriculture, one of them, upon the plains vegetation of the arid region of Oregon, lying between the Blue Mountains and the Cascade Range. This agent has presented a report upon this work, which, together with an investigation on similar lines for the plains of the Columbia, in the State of Washington, will form the basis of a general report on the plant resources of the whole subarid region of these two States after an examination of the remainder of this region south and southwest of the Blue Mountains has been made. Another agent was employed to make an examination of the flora of southern Utah and adjacent portions of Nevada and northern Arizona, for the purpose of ascertaining the plant resources of this area and of mapping its plant zones. A partial report on this subject has been submitted by the agent in Alaska, who continued his work during the season of 1894 in the interior, and returned to Washington with his collections late in October. He has since submitted a report on his work in that region.

EDITORIAL WORK.

During the fiscal year 1893-94 several reports were submitted to the Botanist, with a view to their publication, but in the absence of sufficient time for editorial work it was impossible to give them their final preparation for the printer. In order to expedite the publication of these reports, an editorial assistant was asked for and allowed. During the year this assistant has edited, in connection with the Botanist,

seven reports besides several circulars and briefer articles, and has read the proof of all publications issued, besides attending to other bibliographical work of the division.

LIST OF PUBLICATIONS.

The following publications have been issued during the year:

- Report of the Botanist for 1893. By Frederick V. Coville. Issued August 27, 1894. 8°, pp. iii, 235-244.
- Circular No. 2. Nut Grass. By Lyster H. Dewey. Issued October 27, 1894. 8°, pp. 4, fig. 1.
- Circular No. 3. The Russian Thistle. By Lyster H. Dewey. Issued January 4, 1895. 8°, pp. 8, figs. 3.
- Contributions from the United States National Herbarium, vol. 1, No. 9. Report on a Collection of Plants Made in the States of Sonora and Colima, Mexico, by Dr. Edward Palmer, in the years 1890 and 1891. By J. N. Rose. Issued January 31, 1895. 8°, pp. v, 293-434; pl. xiii, figs. 10. Title page, preface, and index to vol. 1, pp. viii.
- Bulletin No. 16. American Ginseng: Its Commercial History, Protection, and Cultivation. By George V. Nash. 8°, pp. 16, figs. 2. Issued February 25, 1895.
- Circular No. 4. The Flat Pea. By F. Lamson-Scribner. Issued March 8, 1895. 8°, pp. 7, figs. 2.
- Circular No. 5. Giant Knotweed, or Sachaline. By F. Lamson-Scribner. Issued March 9, 1895. 8°, pp. 4, figs. 3.
- Farmers' Bulletin No. 28. Weeds; and How to Kill Them. By Lyster H. Dewey. Issued May 18, 1895. 8°, pp. 31, figs. 11.
- Report of the Botanist for 1894. By Frederick V. Coville. Issued May 28, 1895. 8°, pp. iii, 161-166.

CORRESPONDENCE.

The correspondence of the Division of Botany was much increased during the year, notwithstanding the fact that a much larger proportion of letters than heretofore has been answered by the sending of suitable printed circulars and reports. The number of letters actually written, however, is 4,557, in addition to several thousand circulars, formal answers to requests for publications, etc. Several thousand specimens of plants were received for identification, representing weeds, poisonous and medicinal plants, and supposed useful plants of many kinds.

FOOD PLANTS.

The Botanist has been gradually bringing together information on the native food plants of the United States, besides data concerning some of the foreign species seemingly capable of cultivation in this country, but not as yet commercially known here. In order to increase the amount of good to be derived from this source, it is very desirable that opportunity be furnished for growing in some suitable place on the Department grounds a collection of such of these food plants, either native or foreign, as give promise of agricultural utility. The special object of this work is not so much to discover plants which are likely to prove staple crops as to point out what plants are useful for local and domestic purposes in diversifying and improving the dietaries of the agricultural classes. Most of the plants which would come under this head do not give sufficient promise of general commercial value to lead seed dealers to pay any special attention to their introduction and cultivation.

CORRELATION OF VEGETATION WITH SOILS.

The Department has undertaken through its Division of Agricultural Soils to point out the mechanical characteristics of the soils best adapted to the cultivation of particular crops, and to indicate by geographical descriptions or by maps the localities in which these soils may be found. The usefulness of such results may be much extended by ascertaining and describing the differences in the natural vegetation of these various soils so as to enable farmers to identify them the more easily. The presence or absence of certain kinds of trees or other plants may thus often inform a prospective owner, tenant, or immigrant of the precise capacity of the land he is examining. It is urged that this correlation of vegetation with soil be undertaken by the Division of Botany in cooperation with the Division of Agricultural Soils.

BOTANICAL ARTIST.

One of the most serious drawbacks encountered in the preparation of reports is the difficulty of securing good drawings of plants. The nature of this work is such that large orders can not be made in advance, while the routine of securing contracts is so slow and subject to such technicalities that small lots of drawings satisfactorily executed can with difficulty be obtained. Several hundred drawings are needed to illustrate reports now in preparation—reports the contents of which, on account of the technical nature of descriptive botanical language, would be largely unintelligible to farmers if issued without illustrations. An effort should be made to secure and retain on the permanent roll a skilled botanical draftsman.